

HZ-3220A

20W DC Resistance Testing Meter

Temperature Rising Tester



Dear user:

Thank you for choosing HZ-3220A 20W DC Resistance Testing Meter Temperature Rising Tester.

We hope that this instrument can make your work easier and more enjoyable, so that you can get the feeling of office automation in the test and analysis work.

Before using the instrument, please read this manual, and operate and maintain the instrument according to the manual to prolong its service life. "Just a light press, the test will be completed automatically" is the operating characteristics of this instrument.

If you are satisfied with this instrument, please tell your colleagues; if you are not satisfied with this instrument, please call (0312) 6775656 to tell you to serve you at all times-Baoding Huazheng Electric Manufacturing Co., Ltd., our company will definitely make you satisfied !

Contents

I. General	1
II. Safety Measures	1
III. Performance Characteristic	2
IV. Technical Index	2
V. System Description	3
VI. Testing And Operation Methods	4
VII. Precautions	15
VIII. Common Problems And Solution Methods	16
IX. Packing List	17

I. General

DC resistance of transformer is one testing item which must be tested during ex-work test of semi-finished products and final products, installation, acceptance test and preventive test of electric power department, which can effectively find out material selection of transformer coil, welding, looseness of connection part, missing strand, broken wire etc manufacturing defect and existing hidden problems after operation. The traditional high and low voltage series connection test of the constant current source can't be applied during temperature rise test of the power transmission transformer because difference between high and low voltage windings of the transformer is great. Now if two testing meters are applied for testing, it is liable to damage the instrument because of mutual induction between high and low voltage windings of the transformer. Our company has developed and researched this instrument, which solves this problem. The instrument applies double constant current source design, CUP program controlled charging and discharging sequence and perfect protection measures, which is highly applicable to temperature rise test of the transformer with great difference between high and low voltage windings.

II. Safety Measures

1. Ensure to carefully read the manual prior to use the instrument.
2. The instrument operator shall have general application knowledge about electric equipments or instruments.
3. The instrument can used indoor and outdoor, it shall avoid application location with rain, corrosive gas, heavy dust, high temperature, direct sun shining etc.
4. The instrument is high precision instrument, it shall avoid violent vibration.
5. Only professional personnel is allowed to carry out repair, maintenance and commissioning of the instrument.
6. When testing is complete, ensure to switch off power supply and disconnect testing line after discharging alarm is stop.
7. Switch shift of transformer only after discharge alarm is stop during measurement of

no-load voltage regulating transformer.

8. Prohibit disconnect and move testing clip and power supply line during testing.

III. Performance Characteristic

1. Output current of the instrument is great (maximum output is 20A) and testing scope is wide(maximum 2KΩ), which is applicable to temperature rise test and measurement of DC resistance of all transformers at 35KV voltage class and below.
2. Perfect double power supply design. Simultaneous testing and individual testing function of high voltage side and low voltage side.
3. This machine has protection alarm function for input mis-connection of AC380V power supply, wire breakage and arcing resistant protection function and sound discharging alarm function, indication is clear and mis-operation is reduced. With perfect protection circuit, reliability is strong.
4. Large colourful screen, touching control operation and display data is clear and legible.
5. Temperature rise testing is printed out automatically according to setting time, and temperature rise data are stored, which facilitate recording.
6. The instrument is equipped with the perpetual calendar, 100 groups of conventional data storage, and result storages of 3 temperature rise tests. Data will not be lost after shutdown, which facilitate review. It is equipped with the "U disc" interface which conveniently export data for the machine to generate the temperature rise curve.
7. The instrument is equipped with RS485 communication interface, remote control measurement can be realized after upper position machine operation and control software is installed.
8. This machine is equipped with temperature rise software, which can carry out data processing and generate temperature rise curve automatically.

IV. Technical Index

1. Output current:

High voltage CH1: 5A, 1A, 0.3A,0.1A, 0.01A

Low voltage CH2: 20A, 10A, 5A, 2A

2. Measuring scope:

(High voltage CH1---5A): 0Ω — 4Ω

(High voltage CH1---1A): $20m\Omega$ — 20Ω

(High voltage CH1---0.3A): $60m\Omega$ — 60Ω

(High voltage CH1---0.1A): $200m\Omega$ — 200Ω

(High voltage CH1---0.01A): 2Ω — 2000Ω

(Low voltage CH2---20A): 0Ω — 0.1Ω

(Low voltage CH2---10A): $2m\Omega$ — 0.4Ω

(Low voltage CH2---5A): $4m\Omega$ — 0.8Ω

(Low voltage CH2---2A): $10m\Omega$ — 2Ω

3. Accuracy: (high voltage CH1): $0.2\%\pm 1\mu\Omega$

(Low voltage CH2): $0.2\%\pm 0.2\mu\Omega$

4. Minimum resolution: $0.1\mu\Omega$

5. Interval for temperature rise record data: 5s-90s (Can be set at 5s interval)

6. Working temperature: $-20\sim 40^{\circ}\text{C}$

7. Ambient humidity: $\leq 80\%\text{RH}$, no dewing

8. Working power supply: AC: $\text{AC}220\text{V}\pm 10\%$, $50\text{Hz}\pm 1\text{Hz}$

9. Volume: 360mm length $\times$ 280mm width $\times$ 170mm height

10. Net weight: 8 kg

V. System Description

Refer to figure one for front panel of the instrument.

1. Liquid crystal display screen: display selection item and testing data, and touch control operation.
2. Low voltage end CH2 I-: CH2 current output terminal at low voltage end.
3. Low voltage end CH2 V-: CH2 voltage measurement input terminals at low voltage end.
4. Low voltage end CH2 V+: CH2 voltage measurement input terminals at low voltage end.
5. Low voltage end CH2 I+: CH2 current output terminal at low voltage end.

6. High voltage end CH1 I-: CH1 current output terminal at high voltage end.
7. High voltage end CH1 V-: CH1 voltage measurement input terminals at high voltage end.
8. High voltage end CH1 V+: CH1 voltage measurement input terminals at high voltage end.
9. High voltage end CH1 I+: CH1 current output terminal at high voltage end.
10. Power supply switch: Switch on and switch off power supply of whole machine.
11. Printer: Print current, resistance and auxiliary information results.
12. ⏏ : Earthing terminal serves as enclosure earthing of whole machine, which belongs to protective earthing.
13. RS485: Standard 485 communication interface.
14. Interface of U disc: use to export temperature rise data record, and connect the machine to generate the temperature rise curve.

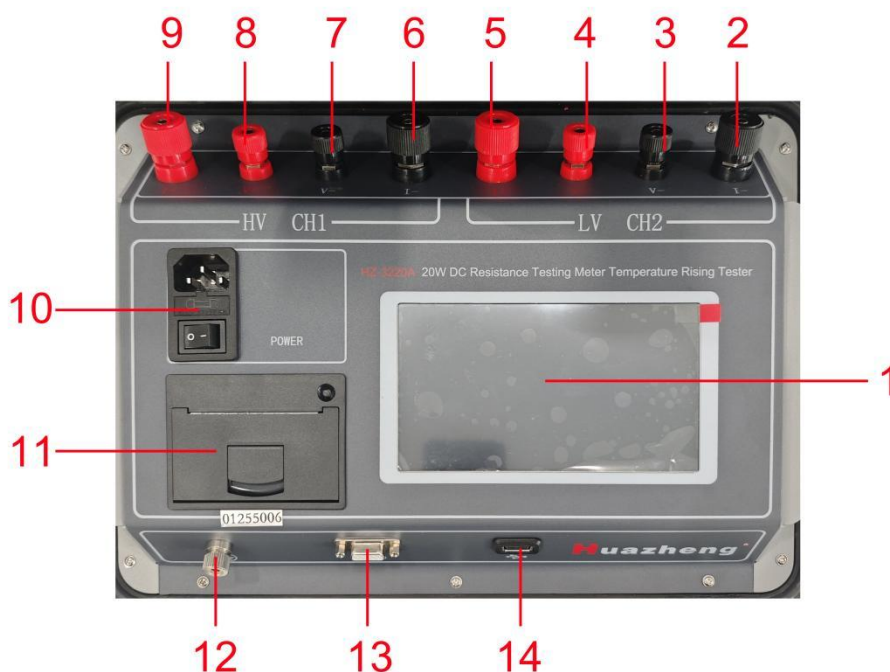


Figure 1(Front Panel)

VI. Testing And Operation Methods

1. **Wiring:** The tested product is connected with the testing wiring column of the machine through the special cable. The thick red wire insertion piece of the testing

cable is connected with I+ current end. The fine red wire insertion piece is connected with V+ voltage end. The thick black wire insertion piece is connected with I-current end. Connection between the fine black wire insertion piece connection V-voltage end is firm and prevent looseness.

Connect earth line well at same time. Wire clamps are clamped at two ends of coil resistance of tested product.

The power supply lines supplied with the machine shall be connected to input port AC power supply.

(If the power supply is connected with AC380V by mistake, open the power supply switch and the buzzer which internal protection is active will always alarm, switch off internal power supply of the instrument, and now it is necessary to inspect whether the power supply is correct).

Simultaneous measurement wire connection of two channels: Refer to figure 2.

*** When two channels are used at same time, they shall be connected with CH1 and CH2 channels respectively as high voltage end and low voltage end of the transformer, don't connect reversely so as to avoid affecting testing results.**

Direct measurement wire connection of high voltage CH1 channel: Refer to figure 3.

*** When only high voltage CH1 channel is selected to measure, connection wire of low voltage CH2 shall be disconnected so as to avoid affecting testing time and result.**

Direct measurement wire connection of low voltage CH2 channel: Refer to figure 4.

*** When only low voltage CH2 channel is selected to measure, connection wire of high voltage CH1 shall be disconnected so as to avoid affecting testing time and result.**

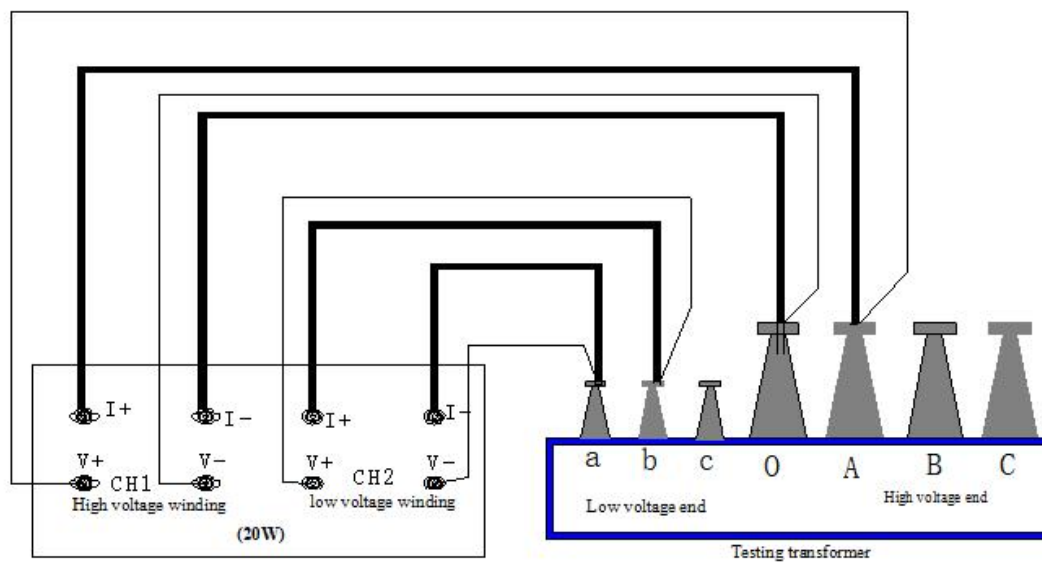


Figure 2 (Simultaneous measurement of two channels)

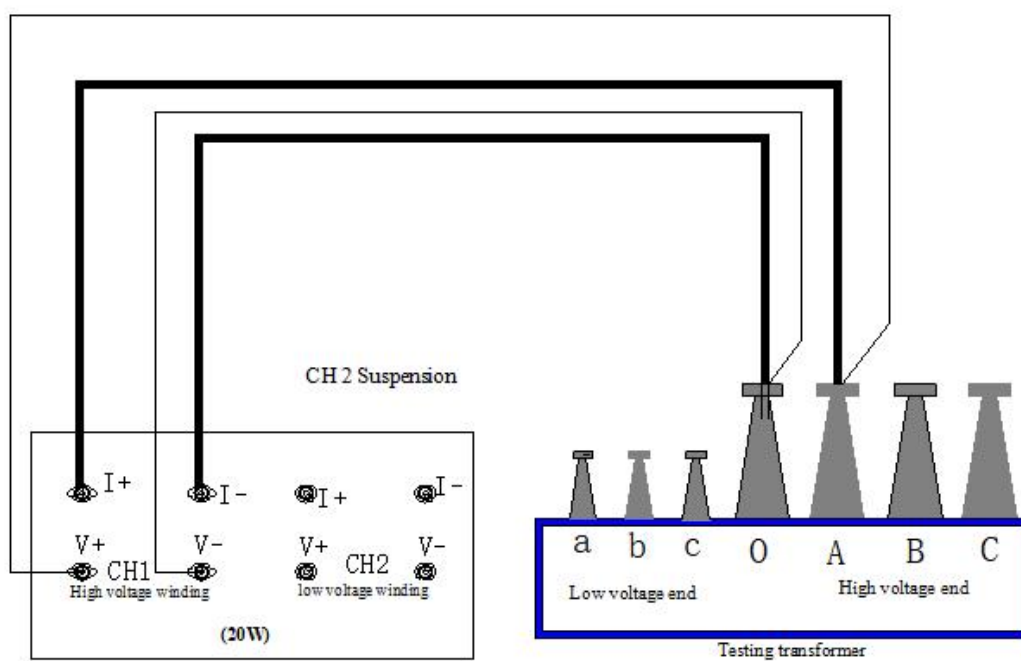


Figure 3 (Direct measurement of high voltage CH1 channel)

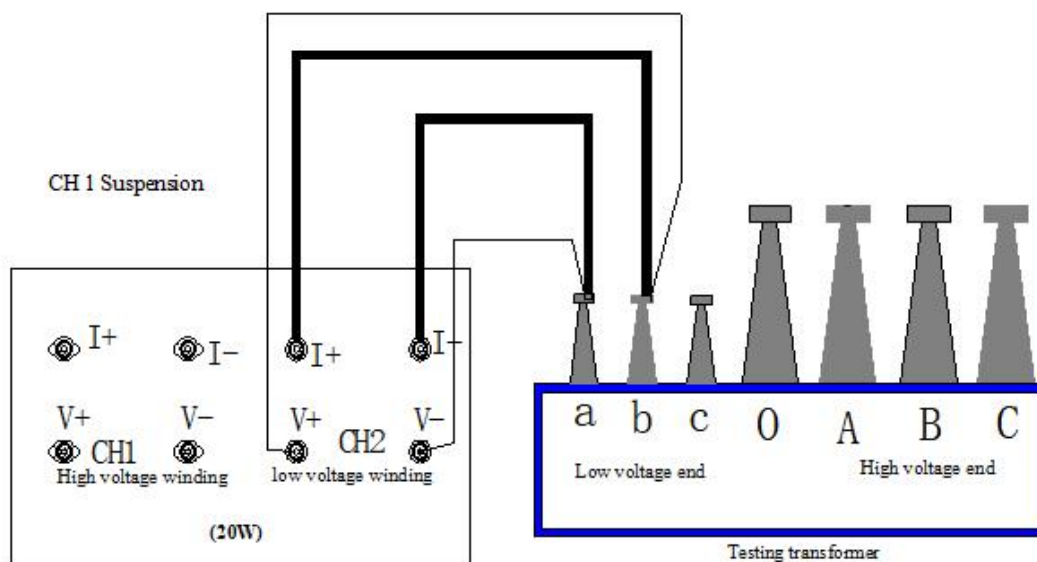


Figure 4 (Direct measurement of high voltage CH2 channel)

2. **Selection setting:** Switch on the power supply switch, the “Kingrun instrument” interface will be displayed on the display screen, then automatically skip to selection setting main interface as figure 5 after approximate 3 seconds.

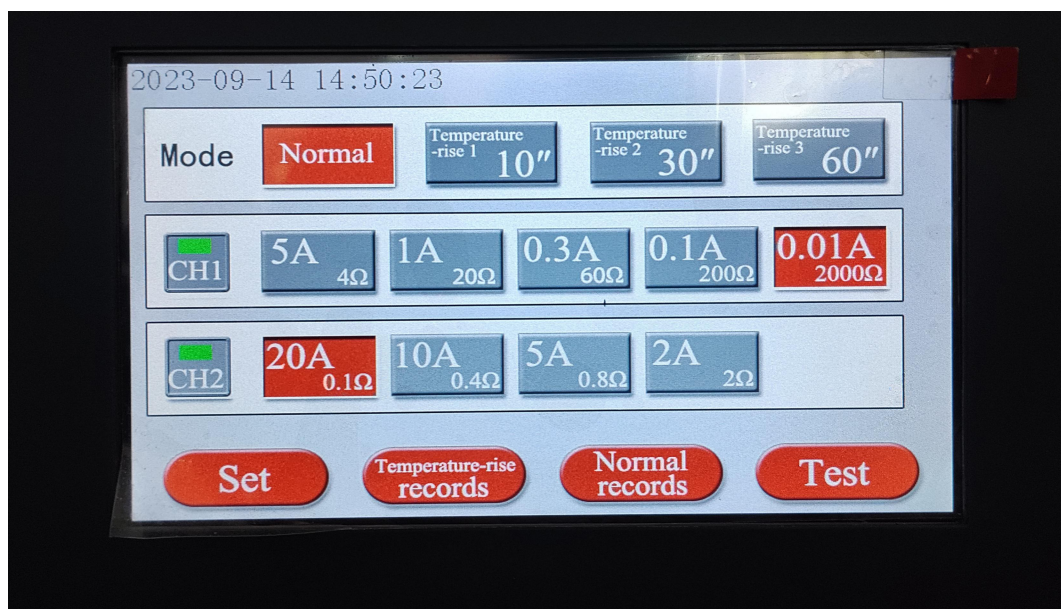


Figure 5 (selection setting interface)

Mode selection: The interface shown as figure 5 is displayed on the display screen, now carry out selection through touching and controlling the corresponding mode selection phase, the red point is lit after it is selected. Selected temperature rise mode “Testing” key is changed to “Timing” key.

Selection of CH1 channel: The interface shown as figure 5 is displayed on the display

screen. Now select the CH1 channel or close the CH1 channel through touching and controlling the corresponding CH1 push button. Select the CH1 channel, the indication lamp is lit green, now corresponding current phase selection is selected and lit on. The indication lamp for closing CH1 channel is black, now corresponding current phase selection is closed completely. The CH1 channel is prohibited to use.

Selection of CH2 channel: The interface shown as figure 5 is displayed on the display screen. Now select the CH2 channel or close the CH2 channel through touching and controlling the corresponding CH2 push button. Select the CH2 channel, the indication lamp is lit green, now corresponding current phase selection is selected and lit on. The indication lamp for closing CH2 channel is black, now corresponding current phase selection is closed completely. The CH2 channel is prohibited to use.

*** When the CH1 and CH2 channels are not selected, it will inform “Please select channel” and now it can’t carry out testing.**

Current selection: The interface shown as figure 5 is displayed on the display screen, now select output current of the tested product through touching and controlling. Please refer to corresponding measurement scope to select suitable current. Resistance value following current value is maximum measurement resistance of selected current shift.

3. Conventional testing: After channel and corresponding current are selected at conventional mode, touch and control the “Testing” key and start conventional test, (shown as figure seven) display indicates value of charging current according to corresponding channel and also informs “Charging ...”, system clock starts to count time and displays time from beginning of charging, start to count time from zero again after one hour is due, not affect testing process. The screen will display applied testing current after current is stable, indicates “testing ... ” at same time, and then observe whether testing current value and resistance value are stable, the instrument continues to test after they are stable.

When two channels are selected to test, the system enters into program controlled testing automatically. Firstly carry out charging process of CH2. After charging of CH2 is complete, and then carry out charging process of CH1.

When any one channel is selected to test, it will not be controlled by program

control testing.

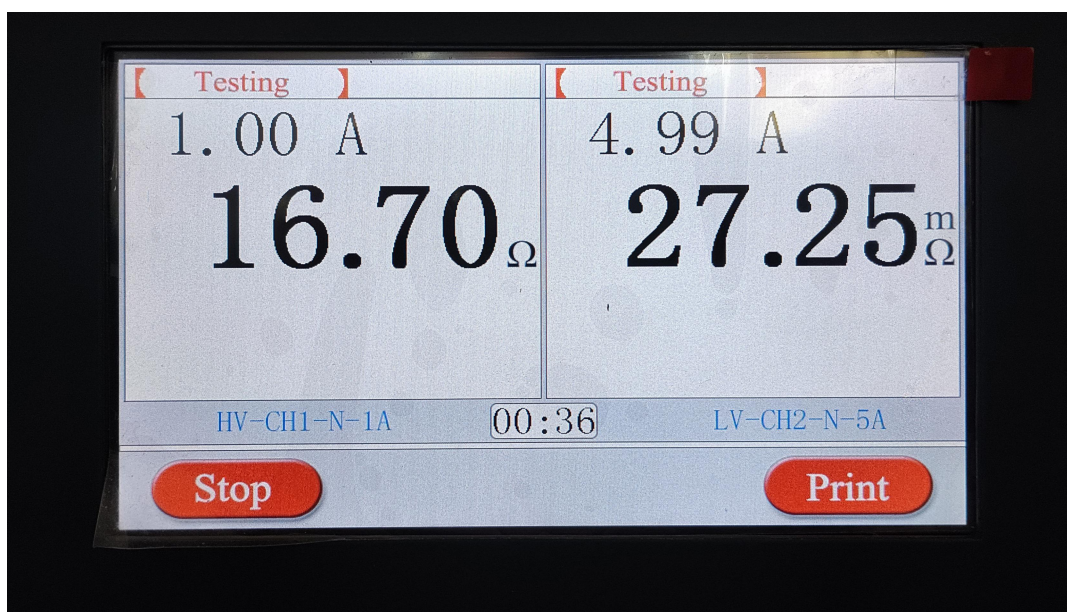


Figure 6 (conventional testing interface)

During the test, touch the **"stop"** key, the instrument output current will be disconnected from the

windings, and the test finish with a discharge prompt sound, the prompt message will display **"Discharging"**,

lock the test data, the interface is shown in Figure 6.

"Exit" function key, Touch the "Exit" key, conventional testing will be complete. The instrument outputs current and disconnects with the winding, and it will be discharged at same time, and sound alarm is displayed as figure ten. After discharging is complete, the display screen returns back to selection setting interface (figure 5), and connect the wires again. Carry out next measurement or remove the testing wire and the power supply wire, measurement is complete.

"Print" function key. Touch the "Print" key, selection information, testing data and testing date and time etc will be printed out.

"Edit" function key, touch **"Edit"** key will enter the editing interface as shown in Figure 7.

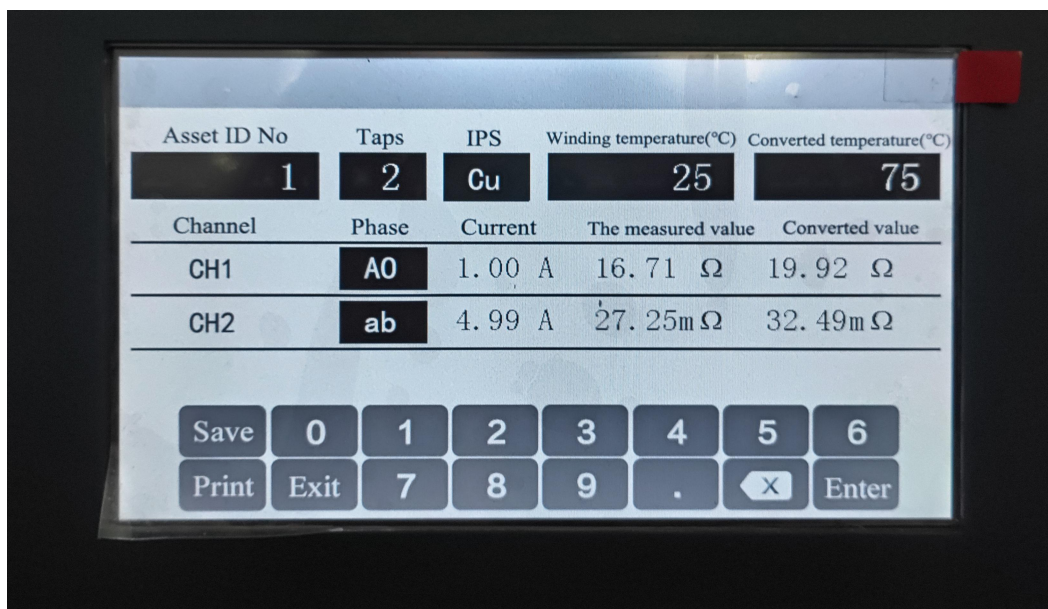


Figure 7 (Edit interface After finish conventional test)

“Save” function key, Touch the **“Save”** key and information displayed on the screen will be saved in the internal memory so as to facilitate review. The system can save maximum 100 groups of conventional data.

“Print” function key. Touch the **“Print”** key, the information on the Edit interface will be printed out.

“Back” function key, touch **“Back”** key, return to the conventional testing interface (Figure 6).

When current selected during testing is too small, it will inform **“Change to larger current”**, the instrument will not stop testing and continues display testing result. Because resistance is too small and measurement of the instrument can’t meet requirement, it shall be changed to larger current and test again.

When current selected during testing is too large, it will inform **“Change to smaller current”**, the instrument will not stop testing and continues display testing result. Because resistance is too large and measurement current of the instrument can’t be recharged, it shall be changed to smaller current and test again.

- 4. Temperature rise testing:** After the channel and corresponding current are selected at temperature rise mode, touch the **“Timing”** key to start temperature rise timing, (shown as figure 8) now timing starts and wait to test. When timing is exited, touch the **“Exit”** key to complete timing process, and return back to the selection setting

interface. Complete wiring. Touch the “Testing” key and start enter into the temperature rise testing interface, and start temperature rise testing (shown as figure 9). The display screen indicates charging current value according to corresponding channel and informs “Charging ...” at same time. After charging current is complete and stable, inform “Testing”. When testing current value and resistance value are stable, the instrument continues testing. Now save and print temperature rise data automatically as setting time. The instrument will inform timing collection results of last two times.

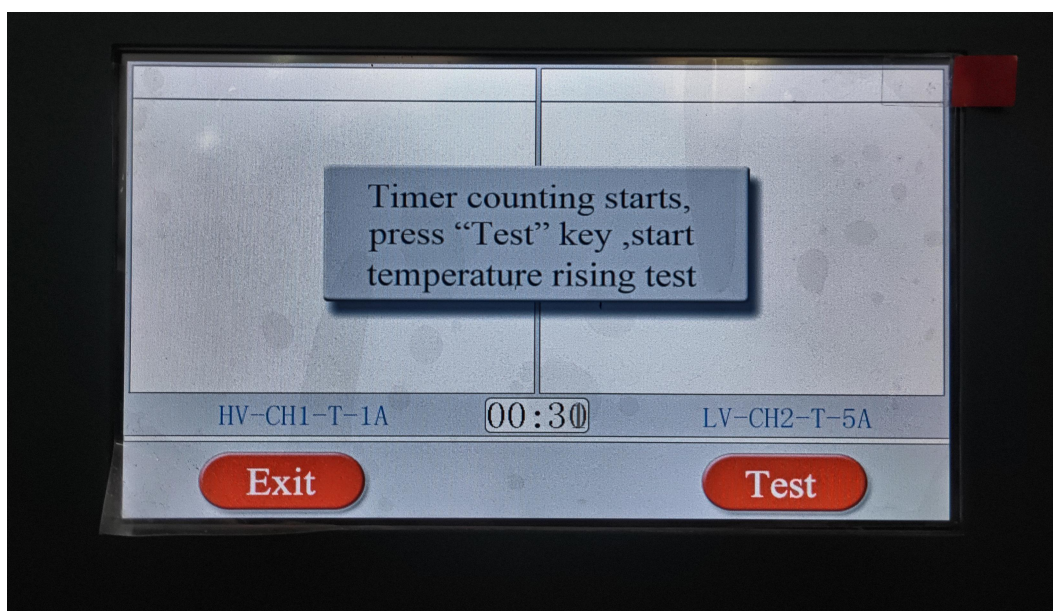


Figure 8 (Temperature rise timing interface)

If temperature rise testing process shall be ended, touch the “Exit” function key and the testing process system will discharge automatically (shown as figure ten). After discharging is complete, it will return back to setting interface.

When two channels are selected to test, the system enters into program controlled testing automatically. Firstly carry out charging process of CH2.After charging of CH2 is complete, and then carry out charging process of CH1.

When any one channel is selected to test, it will not be controlled by program control testing.

*** The instrument only records temperature rise results for three times,and the records will be overwritten cyclically. Original important data shall be exported or recorded before temperature rise test so as to prevent missing.**

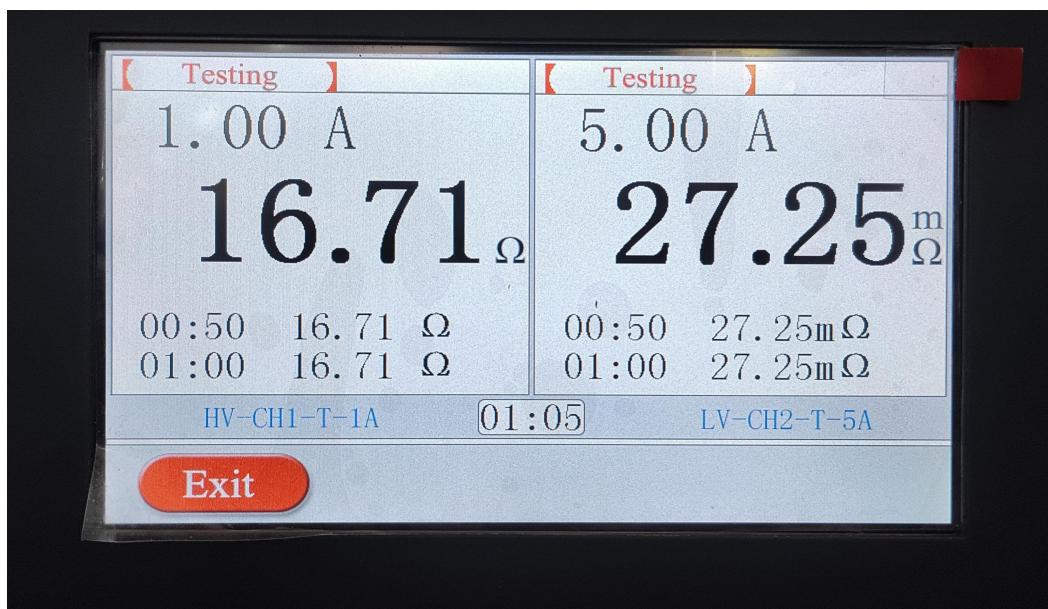


Figure 9 (Temperature rise testing interface)

Even though the instrument will not stop testing in case of over measurement scope, selected current and measurement scope shall be firstly determined whether they are suitable because temperature rise test can't be interrupted. It is generally judged according to testing result at cold state. Therefore cold state testing is carried out firstly to determine measurement scope.



Figure 10 (Discharging interface)

5. Setting interface

Touch and control the "Setting" function key on the interface shown in figure 5, and enter into time input interface shown in figure 11.

Modify time or Temperature rising timing interval at corresponding position according to corresponding upward and downward arrows. After modification is complete, touch the "Exit" function key, and return back to initial status shown as figure 5. The system will run as modified time.

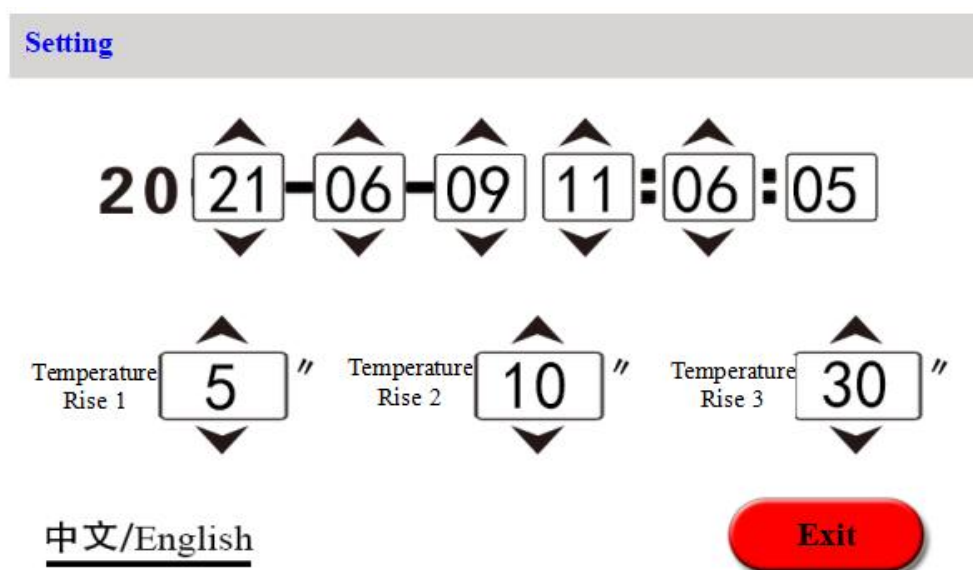


Figure 11 (Time modification interface)

6. Review record and export temperature rise data

Touch the "Temp Rising Record" function key on the interface shown in figure 5, and review the temperature rising record interface as shown in figure 12.

Temperature rise data can be saved 3 sets. Touch the catalogue time to review corresponding data. Touch page up and page down keys to review, touch and control the "Exit" key and return back to figure 12 to select review interface.

Touch the "import U disc" function key and corresponding temperature rise data are imported into the U disc. If no records are available, catalogue will display "**no record temporarily**". Don't implement corresponding review and import command.

Touch "**Delete**" function key, at this time the corresponding temperature rise data will be selected in the red box. Touch "**Delete**" function key to delete this temperature rise data, (**after deletion of data can not be restored**).

Touch the **Exit** function key and return back to the setting interface shown as figure 5.

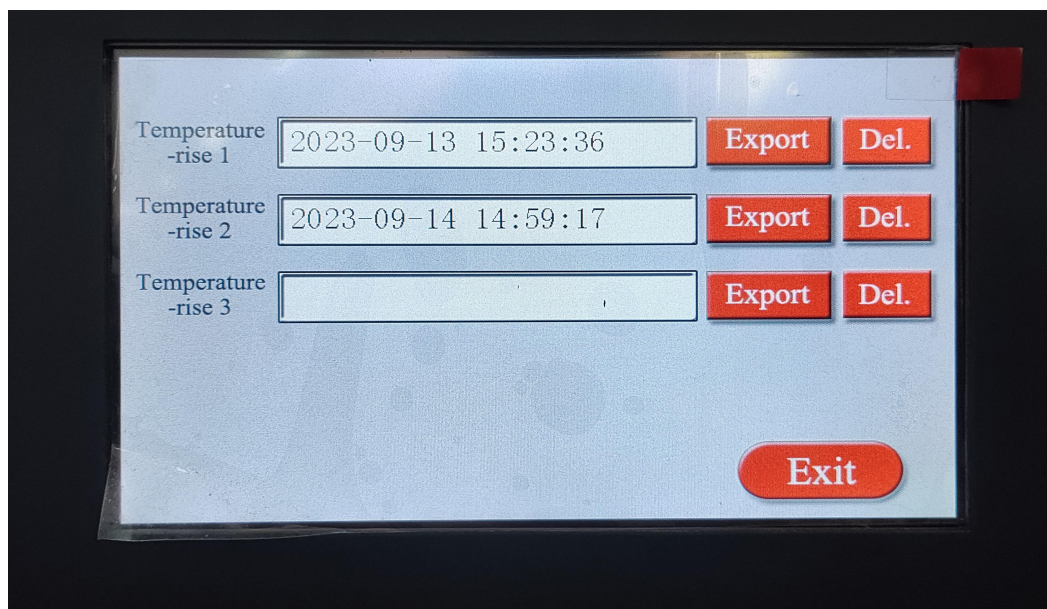


Figure 12 (Temperature rising Records interface)

Touch the "**Conventional Record**" function key under the interface shown in Figure 5 to review temperature rise directory as shown in Figure 13. 100 sets of regular data are saved. Touch the directory time, the record will be selected in the red box. Touch again to view the corresponding data. When a record is selected in the red box, touch the "**DEL**" function key, and this data will be deleted.

Touch the "**Up**" and "**Down**" buttons to turn pages to view. Touch "**Import USB**", all records will be imported into the USB Disc.

The touch "**Exit**" function key returns to the settings interface as shown in Figure 5.

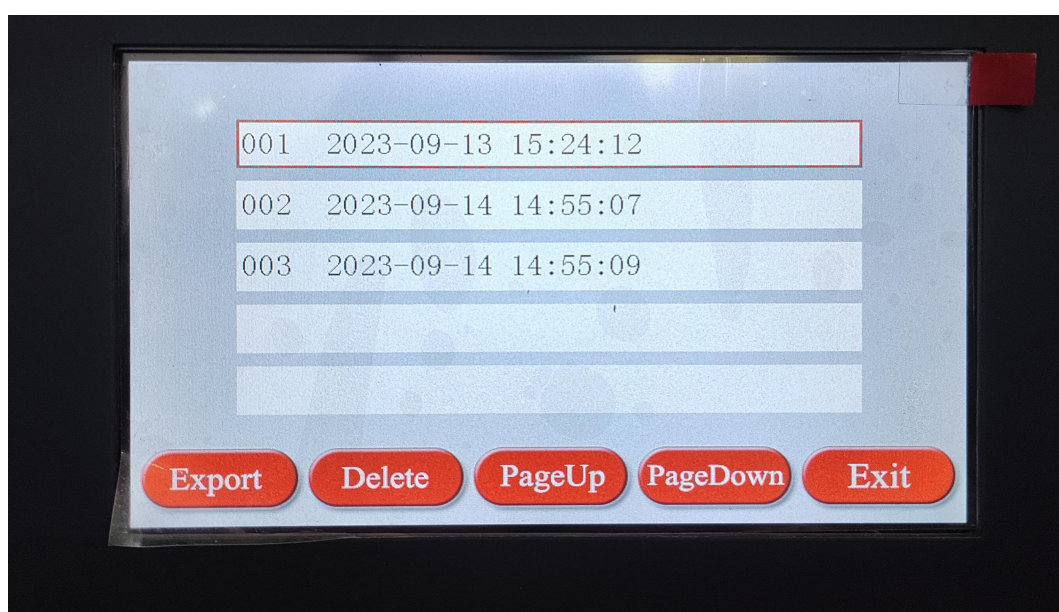


Figure 13 (Conventional records interface)

File name for U dick import is defined as following:

Firstly establish a file folder taking day as unit: DT120408

Where, "DT" is a fixed format of file starting; "12" is last two bits of 2012 year; "04" means April.

"08" means No 8.

And then establish file taking hour, minute and second as units: SJ092458

Where, "SJ" ± is a fixed format of file starting; "09"± means 9 clock of morning; "24"± means 24 minutes;

"58"± means 58 seconds. Establish file taking export time and establishment time. (System default).

7. **"Communication" function, the instrument applies standard RS485 interface,** which interfaces RS485 of the instrument with the machine.

The communication control of the instrument, edit and printing etc functions of the testing data are completed by RS485 interface connection with upper position computer operation software. **Refer to Appendix "Communication protocol" for communication protocol.**

VII. Precautions

1. Ensure to reset before measuring reverse tapping of no load voltage regulation transformer, switch tapping point only after discharge is complete and alarm sound stops.
2. The transformer with on-load voltage regulation shall start measurement from 1 or 17 maximum resistance shift during resistance measurement of high voltage side.
3. Ensure that discharge is complete and discharging alarm sound stops before disconnection, then carry out wire disconnection and replacement.
4. When current is selected, please refer to measurement scope in technical index column, don't use with over measurement scope and down measurement scope.

Large current within the measurement scope shall be selected as possible so as to enhance stability performance. And current withstand capability of the tested product shall be considered as same time. Generally, 3%-10% of the rated current

of the transformer coil is selected for the test current.

5. When the high voltage and low voltage channels are adopted to measure at same time, pay attention to not connect the high voltage channel and the low voltage channel reversely. Otherwise it can't carry out testing.

VIII. Common Problems And Solution Methods

1. Don't start and buzzer continues sound

Firstly check whether power supply is connected with AC380V or voltage of input power supply is too low under such condition.

2. Crystal screen can't be lit when machine is started.

Firstly check whether power supply is normal in case of this situation, and then check whether fuse is broken. If it is broken, inspect whether specification of the fuse is suitable. And then replace by a new one and test again.

3. Liquid crystal screen for starting machine is lit but display is abnormal to display

Firstly start again in case such conditions appear, or inspect whether there is other disturbance source.

4. Testing data isn't stable or error is too great

Firstly check testing wire whether it is virtually connected and loose under such condition. If it isn't still solved, check whether the sample is corroded. Instable data may be caused because selected current is too small. It is solved when large current is selected.

5. Always display "Charging" during testing process

Firstly exclude magnetic circuit problem of the transformer in case of this situation. If the current isn't changed for long time and it is always around zero, check whether there is short circuit phenomenon in the circuit. If current isn't always charged, change corresponding small current and start measurement again.

6. **"Internal Error" prompt.**"Internal Error" indicates that the test channel has failed and requires a reboot. If it cannot be solved, it will need to be repaired.

7. **There is data fluctuation in CH2 channel during CH1 charging process when high voltage and low voltage are measured at same time.**

When such conditions appear, certain voltage is induced at high voltage during low voltage charging, which affects data. After charging of CH1 is complete, CH2 data will resume normal.

*****In case above problem can't be solved by yourself, please contact us in time *****

IX. Packing List

No.	Item	Qty
1	Main machine	1
2	Testing wire	1
3	Three cores power supply cable	1
4	Ground wire	1
5	Fuse 3A	2
6	Printing paper	1